

Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Fowler Creek and Foster Creek¹

Water Body Segment at a Glance:

County:	Boone
Nearby Cities:	Ashland
Length of impaired segment	
Fowler:	6 miles
Foster:	0.5 mile
Pollutant/Source	
Fowler:	Low Dissolved Oxygen/ None given
Foster:	Ammonia/Ashland WWTP
Water Body ID:	
Fowler:	0747
Foster:	0747U-01



Scheduled for TMDL development: 2010

Description of the Problem

Beneficial uses of Fowler Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health (Fish Consumption)
- Whole Body Contact Recreation

Tributary to Foster Branch is unclassified, so no uses are assigned

Use that is impaired

- Protection of Warm Water Aquatic Life

Standards that apply

- In the Missouri Water Quality Standards, found in 10 CSR 20-7.031 Table A, the criterion for dissolved oxygen, or DO, in streams is a minimum of 5 mg/L (milligrams per liter or parts per million).
- When a stream is unclassified, no chronic water quality criteria apply to it; however, acute² criteria do. The criteria for ammonia vary with water temperature and pH. At typical temperatures and a pH value of 7.8, ammonia criteria would be 1.5 mg/L in summer and 3.1

¹ Listed as Foster Creek on the 2008 303(d) List, however this stream is actually an unnamed tributary to Foster Branch. Foster Branch is an unclassified tributary to Fowler Creek. This will be corrected on subsequent lists.

² Acute criteria apply to short exposures to toxic conditions that aquatic creatures can survive without harm. Chronic criteria apply to conditions of constant exposure. These criteria are much lower than the acute criteria.

mg/L in winter (chronic). These values are taken from Table B3 in 10 CSR 20-7.031. From Table B1, the acute criterion at a pH of 7.8 is 12.1 mg/L.

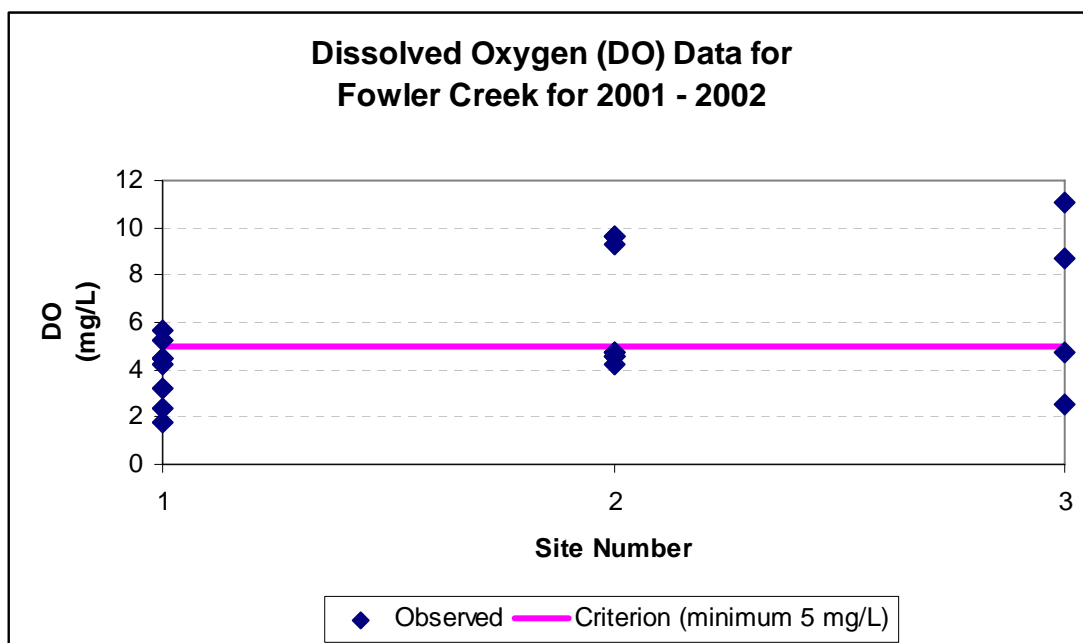
- In addition, all streams in Missouri are protected by general criteria found at 10 CSR 20-7.031(3). The particular criteria that apply to the tributary to Foster Branch include:
 - (D) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life.
 - (G) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community.

Background information and water quality data

Tributary to Foster Branch and Fowler Creek are two small streams in central Boone County, Missouri. The Ashland Wastewater Treatment Plant, or WWTP, discharges to the unnamed tributary to Foster Branch. Foster Branch flows into Fowler Creek, which in turn flows into Cedar Creek at the Boone-Callaway County line. The impairments are based on water quality studies conducted by MEC Water Resources, Inc. on Fowler Creek and tributary to Foster Branch in July 2001 and Aug. 2002.

Dissolved oxygen is important as many aquatic organisms require high levels of oxygen to survive, and DO levels are sometimes low in these creeks. Therefore, water quality conditions in these creeks are not considered protective of aquatic life. For DO, if more than 10 percent of measurements in a water body fail to meet the water quality criteria, that water body is judged to be impaired. In Fowler Creek, 13 of 20 measurements (65 percent) failed to meet the dissolved oxygen criteria of 5 mg/L. It is not known what is causing the DO to be low.

Ammonia is a common by-product of wastewater treatment and, under certain conditions, can be toxic to aquatic life. In Tributary to Foster Branch, MEC Water Resources found eight of eight samples taken 0.2 mile below the Ashland WWTP exceeded the acute ammonia criteria. Like all wastewater discharges in Missouri, the Ashland WWTP must meet the requirements of a discharge permit issued by the department. The limits in this permit can be adjusted to prevent the creek from being impaired.



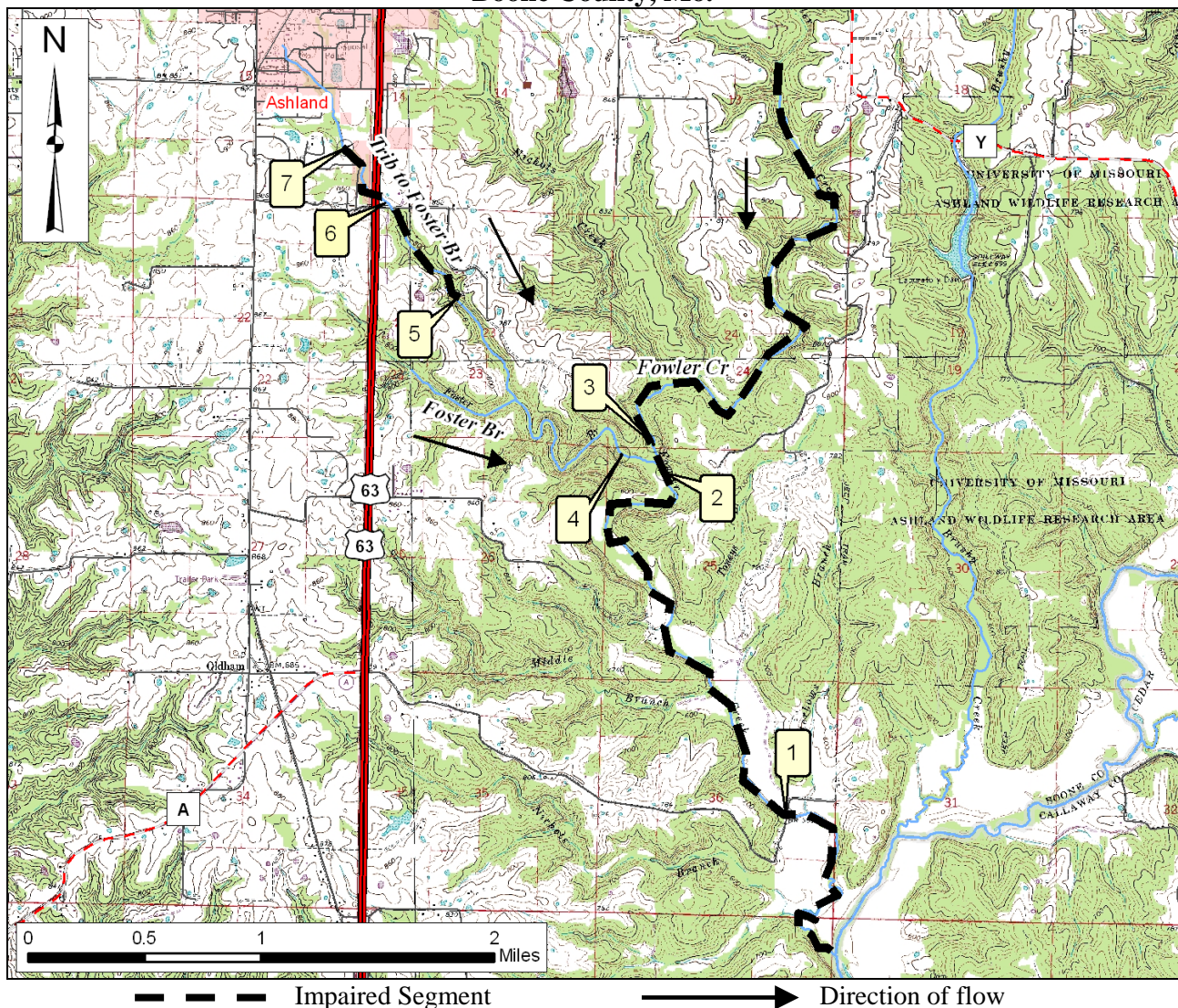
Ammonia as Nitrogen (NH₃N) Data for Tributary to Foster Branch

Site Number	NH ₃ N (mg/L)	Temp (°C)	pH
7	32.5	28	7.7
7	33	29	7.7
7	32.5	28	7.8
7	32.5	28	7.7
6	25.5	26	7.7
6	20.4	29	7.9
6	23.8	27	7.8
6	20.4	30	8.0
6	28.6	29	8.0
6	25.2	26	8.1
6	29.8	22	8.0
6	24.4	26	8.1
5	7.6	25	7.6
5	7.0	28	8.1
5	10.6	26	7.7
5	9.4	29	7.9
5	8.4	22	7.9
5	5.6	25	8.0
5	9.0	19	8.0
5	6.2	25	8.0
4	1.1	26	7.8
4	0.499	28	7.0
4	0.499	26	7.7
4	0.499	28	8.3
4	0.4	26	8.4
4	0.3	23	8.3
4	0.8	24	8.6
4	0.3	21	8.2

Shaded cells show exceedance of acute criteria.

NH₃N values are pH and temperature dependent.

Map Showing Fowler Creek, Tributary to Foster Branch (unclassified) and Sampling Sites in Boone County, Mo.



Sample Sites

- 1 – Fowler Creek at Gilmore Lane
- 2 – Fowler Creek 2.3 miles downstream of Ashland wastewater treatment plant
- 3 – Fowler Creek 0.1 miles upstream of tributary (Foster Branch)
- 4 – Foster Branch 2.0 miles downstream of Ashland wastewater treatment plant
- 5 – Trib. to Foster Br. 0.8 miles downstream of Ashland wastewater treatment plant
- 6 – Trib. to Foster Br. at U.S. Highway 63
- 7 – Trib. to Foster Br. at Ashland wastewater treatment plant

For more information call or write:

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 Program Home Page: www.dnr.mo.gov/env/wpp/index.htm